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Some Biological Notes on Philippine Zoölogy.

BY FRANCIS X. WILLIAMS.

THESE few notes are very fragmentary and not all the data are derived from original investigations. They are set forth, however, in hopes that the reader who has not visited the tropics will find something of interest in them. The writer has spent the total of about two years in the Philippines, chiefly at Los Baños, Luzon, and thus has become acquainted with some features of the natural history of this very rich locality.

ANTS.

It is quite evident that the ant is well off in the tropics. An abundance and variety of food, as well as great diversity of conditions, suit the needs of the multitude of its species and make this family of insects a most conspicuous one. Many ants are harmless, or even beneficial, while others are a great pest in the house or in the field.

The well-known, red tree ant, *Œcophylla smaragdina* Fab. (Camponotinæ) is occasionally a decided nuisance along the outskirts of the forest and in portions of cultivated districts near by. This aggressive insect has at least one thing in its favor, for while it bites viciously, it cannot sting. It is a tolerably large, long-legged creature that lives on trees and bushes, where it constructs an ample ball-like nest of leaves spun together with the silk of its larvæ, which are carried about by the workers as this silk is needed. *Œcophylla* frequently swarms on tree trunks and foliage, and so a passer-by may unknowingly gather some up; of these a few will eventually and unnoticed gain a point of vantage on his person, as the back of the neck, and there bestow a vicious and startling nip. Certain homopterous bugs that produce honeydew are attractive to

these ants and protected by them, but other insects that are not thus useful, and that can put up a struggle, are subjected to a gruelling treatment before they succumb. And so it is not unusual to come upon some unfortunate bee or beetle stretched out, more or less tautly, as fire fighters hold a life net, by a circle of these ants, each steadily and relentlessly pulling on a leg or other portion of the victim's anatomy.

The large genus *Polyrhachis* is best represented in the forest. These ants also use silk in nest building, but usually mix in with it small debris of various sorts. A large number of the species have a glossy appearance. Some make a sort of ball-like nest among the leaves of bushes; others will cover over a hollow, as the cut end of a bamboo, with a sheet of debris. Others still, often large species, will build on the trunks of trees, where the nests are placed in crevices or among the exposed roots. In these, the tubular aperture to the nest, with its soft, flexible rim, was found to bear fine, more or less inward-projecting hairs. Other nests may be high up upon tree trunks, and measure as much as a foot and a half long by about half as wide. They consist of a bulging sheet or curtain of silk, etc., secured along its margin to the tree trunk. I remember such a nest on the underhanging side of a tree with pale bark, and which color it somewhat resembled. As the name implies, these insects are armed, more or less, and sometimes in quite a fantastic manner, with spines or hooks, which, as they will often stick into one's fingers, may make capture rather awkward. *Polyrhachis* is only a fair nipper, but the offensives and defensives are effected mainly by raising itself upon its legs, curving the abdomen under and forward, and the squirting out a fluid.

The myrmicine ants of the genera *Solenopsis* and *Phidologeton* can be very annoying insects, particularly during the wet season. *Solenopsis geminata* Fab., also known as the fire ant because of its smarting sting, is widely distributed in the tropics of both hemispheres. It is a rather small, yellowish-brown species that often swarm in the lowlands. In *Phidologeton* we have a genus of few species that appear more shade-loving than *Solenopsis* and which also live in very large colonies. The great majority of specimens in a nest are of small size, but the queens and the largest neuters or soldiers are comparatively immense. The ants are great travelers, and their irregular columns, often encountered crossing a path, are sparsely though conspicuously sprinkled with the great polished soldiers. These big, lumbering creatures are not to be feared; it is

the army of little workers that must be respected, for they are of a vindictive nature and lose no opportunity of using their sharp mandibles. *Phidologeton* will occasionally invade houses here, and once in a while some of the occupants are driven out of bed. There is a record of a village in India having to shift because of these troublesome ants ("Fauna, British India, Hymenoptera," II, p. 161, 1903; Bingham quotes Rothney). The genus belongs to the Indo-Malayan region, and, like *Solenopsis geminata*, is largely granivorous. It is to be noted, then, that meat eaters are not always the fiercest. *Pogonomyrmex*, the aggressive and efficient stinger among ants in some of the more arid portions of the United States, is also a granivorous insect.

While the ponerine ants are comparatively few and inconspicuous in the United States, this primitive subfamily is very well represented here and contains some of the largest and commonest ants. Notwithstanding their superior size, in many cases they cannot cope against quite small, well-armed ants. This was noted in the genus *Diacamma*, and upon an invasion by such small ants, the former will grab bag and baggage, and, hurrying out of their nest, commonly situated in a tree trunk, await the departure of the marauders. Besides, as is generally the case with the Ponerinæ, their colonies are small, and sting and jaws do not count for much against a superior number of small ants, especially when many of the latter discharge a very disconcerting fluid in their battles.

The Dorylinæ include the famous driver or legionary ants of the American and African tropics, that in their foraging marches clear the path of insects and other creatures. In the Philippines I have observed no such formidable ants, and the only representatives of this subfamily familiar to me are rather small, wiry black species of the genus *Ænictus*, that travel in narrow columns. The workers, although blind, march with order and great activity. They appear to prey on other ants.

While still on the subject of ants, it would be well to consider briefly some habits of the rather large muscid flies, *Bengalia* sp. These are somber-colored insects of alert habits that hang around the passing columns of certain ants, very often those of *Phidologeton*. It is quite usual to see one or more of these flies perched right near the moving ants, and once in a while to approach a burdened ant, seize and snatch away its load and to consume it at a safe distance. *Bengalia*, then, feeds upon the early stages of ants and whatever palatable food the ants may carry. Thus, a *Phidologeton*

army returning, laden mostly with soft, white ants or termites, was patronized by one of these flies. The burdens being large, however, necessitated several ant-carriers apiece, and thus made it rather difficult for *Bengalia* to operate.

Among the numerous arthropods that resemble ants are various spiders. That some of these are more or less associated with the ants they resemble is beyond doubt, but the whole subject, I believe, is still in a rather speculative stage. There are spiders that resemble *Œcophylla;* many, *Polyrhachis;* some, *Diacamma* and others. This resemblance is often excellent, though one will learn quickly to differentiate ant and spider. The latter usually has much the better vision of the two, and so if disturbed will wheel about sharply, very unlike an ant. Spiders have four pairs of legs, and these ant-resembling species, in what suggests to us an endeavor to mimic antennæ, will wave the first pair of legs, also unlike an ant. While these spiders are slender, and, like ants, properly constricted, the large chelæ do not much resemble the jaws of ants. They have somewhat the habits of attid spiders.

SOME BUTTERFLIES.

Butterflies are not all children of the light. The tropics possess a number of species that are addicted to a night life, or that at least avoid the sunlight—mainly somber-colored insects that belong to the families Hesperiidæ (or skippers) and Satyridæ—and elsewhere they may be seen at sunset, or perhaps earlier on dark days, and sometimes also before sunrise, flying about, feeding or laying their eggs. I have found them coming to light but rarely, and it seems probable that they are not so active when the night is far advanced.

The largest of these crepuscular species that I have observed is the coconut nymphalid, *Amathusia phidippus* Johanssen, a graceful brownish insect with a wing expanse of about four inches. The larva eats the leaves of the banana, the cocoanut, and probably of other palms.

The banana leaf roller, *Erionota thrax* Linné, is quite a large skipper butterfly, whose larva makes a retreat of a strip of banana leaf, which it cuts away from the edge and more or less parallel to the midrib and rolls up as a wide ribbon. When it has outgrown or consumed most of this roll, it constructs another and larger one and pupates in the last one made. The larva is covered with a mealy white substance.

A skipper even larger than the banana leaf roller, and also prob-

ably crepuscular, lays its eggs on the rattan (*Calamus*), a species of thorny and climbing palm. The larva is covered with a flocculent white material. It pupates in a neat retreat of rolled-up leaflets. The sensitive pupa even when gently disturbed, will so move as to produce what is at first a rather startling, whirring or scraping noise. Other large skippers feed also on palms, on plants of the ginger family, and on Araliaceæ.

The largest as well as one of the handsomest of the day butterflies is the bird-wing butterfly, *Ornithoptera nephereus* G. R. Gray, with colors chiefly velvety black and brassy yellow, and a wing expanse of about six or six and a half inches. Though a fine insect, it is by no means the largest nor the handsomest of the genus. It is found in the lowlands to some distance up in the forest. The larva feeds on a species of *Aristolochia* or "Dutchman's pipe vine," which it shares with *Papilio antiphus* Fabricius, a much smaller, mostly black butterfly. The larvæ of these two species, as well as that of *Papilio philenor* Linn of North America, resemble one another somewhat in that they have fleshy processes on the body. The pupæ also are swollen at the sides much more than any other pupæ of *Papilio* that I know of.

The genus *Ornithoptera* is sometimes considered a subgenus of *Papilio,* and ranges south, well into Australia.

FIREFLIES.

We have fireflies with us practically throughout the year. This is in striking contrast to the comparatively brief season of the adult beetles in the United States. But there is this much to be said in favor of the latter. I have seen no Luzon island lampyrid that equals in brilliancy the light that is emitted by *Photuris pennsylvanica* of the Eastern United States.

There are quite a number of species found in this portion of the Philippines. Some have a weak luminosity, while others are quite brilliant, and it is a common thing to see a whole bush or crown of a tree sparkling like an old-fashioned Christmas tree, with hundreds of these insects. Such trees, especially when isolated, are visible from quite a distance.

While the larvæ of fireflies, being luminous themselves, are not difficult to find, I do not believe that many Philippine species have yet been associated with the adults. I have found some, as related by Fabre in Europe, devouring snails within their shells, the victim having been overcome on some bush or on the ground. In the

United States the larva of the genus *Phengodes* is known to feed upon myriapods. Here at Los Baños is a related insect with a similar prey. I have kept some of the larvæ in captivity and fed them living myriapods of at least two species, and have several times seen the beetle larva overcome its large prey. It would grasp the myriapod by an antenna, and while its victim might struggle violently, the sharp mandibles of the aggressor seemed eventually to pierce the antenna and to discharge through it a quieting fluid. At any rate, the prey is rendered helpless without further biting, and its interior hollowed out by the voracious larva.

OTHER THAN INSECTS.

One concerned chiefly with the study of insects cannot, however, fail to secure an interest in other invertebrates, as well as vertebrates, that come to his notice.

The land leech is one invertebrate with which those who explore the mountain woods in damp weather soon become acquainted. If the leech feeds solely on blood, it must possess great powers of fasting. It is a tough, wormlike creature, often adorned with brilliant stripes, and that measures in the neighborhood of an inch in length. It is furnished with an anterior and posterior sucker, by the use of which it travels much after the fashion of certain moth caterpillars known as inch worms or loopers. It is very alert to a footfall, and from some little distance, conscious of the presence of man or beast. Perched on an herb or in the middle of a trail, and raised up on its hind sucker, it is quick to grasp a passing leg with the anterior sucker and climb on. Other leeches in the vicinity may wave their head end, or move along in haste in search of this prospective meal. Once aboard, the hungry leech seeks to make a puncture in the skin. This may be a difficult matter in the case of a human being whose legs are well wrapped in cloth puttees, or else very easy if leather leggings or none are concerned. Firmly affixed, it becomes so filled with blood as to present a very rotund and inactive appearance, and eventually to drop off. The leech, however, is on the whole much more disgusting than painful, as in fact one may not become aware of its work until it has dropped off, full fed. Like the hobo, the leech does not relish soap, and the barefooted native keeps this in mind and secures partial protection by rubbing it on.

Most people look upon the crab as a denizen of the sea, or at least as an inhabitant near the seashore. However, rather small-sized crabs inhabit fresh-water streams near Los Baños, and I have found

them from two to three miles up such watercourses, the latter flowing into a large lake. One of these crustaceans was dug out of a decayed log along a stream at an altitude of perhaps 700 feet on Mount Maquiling.

Tailless amphibians are numerous on Mount Maquiling, and may occur at a considerable distance from permanent water. A quite large species with much of the general appearance of our tree toads patronizes suitable vegetation, and is not averse, on occasions, to visiting houses. Along the streams are large frogs which probably do not equal our famous bullfrog (*Rana catesbiana*) in average size. They are very neat and fearless divers, and take surprising headers, from some well-chosen point, into the pool, many feet below.

Of lizards, skinks are the most noticeable, as they scurry away at your approach and rustle among the leaves. They are fond of sunning themselves along the sides of paths. Some are over a foot long and rather stoutly made. Very small lizards, presumably young skinks, are often plentiful in the forest. A species of *Draco,* or flying lizard, seems to occur chiefly in the lower portions of the forest. Its parachuting power is secured through the extension of its ribs beyond the body proper, so that a wide sailing surface can be produced. This expanded area is somewhat gaudily colored and visible only when the lizard is in "flight," for when at rest the ribs are pressed alongside the body. Then the skinny and harmless little creature shows nothing of its aëronautic propensities. It is arboreal, and sails from one tree to another in an easy descent, making a graceful upsweeping landing. Despite such powers, these lizards do not appear to wander far, as I have seen them patronizing the same tree for months.

Coming to grosser lizards, the monitor lizard (*Varanus salvator* Laur.) is noticeable for its large size and noisy haste when alarmed. It reaches a length of several feet and is pretty well at home in the water, on land or up in a tree. It no doubt consumes a variety of food and has quite a reputation as a chicken thief.

While snakes are common here, they are not to be found on every occasion, and large ones are somewhat of a rarity. Pythons (*Python reticulatus* Schneid.) occur in this region, and several years ago two soldiers shot a specimen about twenty-four feet long. Such examples are few and far between.

Of birds, the red jungle fowl (*Gallus gallus* Linnæus) much like

some of our smaller domesticated chickens, may be heard crowing in the forest far from human habitation. However, they not infrequently associate with the tame fowl.

There are some very gaudy kingfishers in the woods. While some favor streams, others may be found in the dense woods and must be largely insectivorous.

There are no large carnivorous animals here. Mount Maquiling has its full share of wild pigs, deer and monkeys. Any of these may during the night come quite close to human habitations and inflict minor damages to crops. Monkeys travel in companies among the trees and feed upon the abundant fruits. They are not especially noisy and their tails do not appear at all prehensile. A powerful but rare eagle, *Pithecophaga jefferyi* Grant, is known to prey upon monkeys in the Philippines.